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(6) Use of Antisera to Human Plasma Proteins to Measure Specific Monkey Plasma Proteins,

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USE OF ANTISERA TO HUMAN PLASMA PROTEINS TO MEASURE SPECIFIC MONKEY PLASMA PROTEINS[1, 2]

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QUANTITATION OF MONKEY PLASMA PROTEINS

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2. We gratefully acknowledge the technical assistance of John P. Fowler.

3. In conducting the research described in this report, the investigators adhered to the "Guide for the Care and Use of Laboratory Animals," as promulgated by the Committee on Care and Use of Laboratory Animals of the Institute of Laboratory Animal Resources, National Research Council. The facilities are fully accredited by the American Association for Accreditation of Laboratory Animal Care. The views of the authors do not purport to reflect the positions of the Department of the Army or the Department of Defense.

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Key Words

Monkeys

Plasma proteins

Radial immunodiffusion

SUMMARY

Antibodies against specific human plasma proteins were used to estimate the concentration of ceruloplasmin, haptoglobin, alpha$_1$ acid glycoprotein, transferrin, and alpha$_1$ antitrypsin in the plasma of rhesus, cynomolgus and squirrel monkeys.

Plasma acute-phase globulins increase in concentration during injury, infection and various inflammatory diseases (1,2). In fact, certain of these proteins appear to be very sensitive indicators of the extent and persistence of injury/inflammation (3). Other plasma proteins have been used as monitors of nutritional status (4). It has been hypothesized that many of these plasma proteins interact with other aspects of host metabolism, physiology and immunology to ameliorate the consequences of disease and enhance healing (5). Monkeys, being closely related to man, have been used to investigate a wide variety of diseases and nutritional disorders (6,7).

A simple method for quantitating specific plasma proteins would allow assessment of the effects of various diseases and nutritional regimens on individual plasma proteins. To this end we tested radial immunodiffusion plates (5) designed for determination of human plasma proteins for their ability to detect and measure proteins in monkey plasma. Plasma was obtained by venipuncture of three monkeys of each of three selected species. Table 1 shows that all three species of monkeys possessed plasma proteins antigenically related to those of man. Alpha$_1$ acid glycoprotein was present in amounts too low for accurate determination. No reaction was detectable when rat plasma was used instead of monkey. Whether the monkey plasma proteins which react with antisera to human plasma proteins are functionally analogous to those of man remains to be determined, but certain of these proteins do seem to respond during infection in a manner similar to their presumed

5. Prepared by Behring Diagnostics, American Hoechst Corp., Somerville, NJ.

human counterparts (7). There appears to be a fair degree of monkey-to-monkey variation so one might have to use each animal as its own control, as well as using pooled normal, i.e., healthy monkey plasma, for an additional reference.

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TABLE 1

Cross-reactivity of monkey plasma proteins with human antisera

Antiserum[a] Against:	mg/dl (Coefficient of variation[b]) Rhesus (Macaca mulatta)	Cynomolgus (Macaca fascicularis)	Squirrel (Saimiri sciureus)
Ceruloplasmin	67.1 (1.8)	47.7 (8.9)	56.4 (3.9)
Haptoglobin	222.7 (7.9)	317.6 (4.7)	448.2 (5.0)
Alpha$_1$ - antitrypsin	1021.3 (3.7)	904.0 (4.0)	724.0 (7.9)
Transferrin	499.7 (5.6)	506.0 (6.2)	626.7 (5.0)

[a] Ceruloplasmin and haptoglobin based upon undiluted plasma; alpha$_1$ - antitrypsin and transferrin based upon a 1:10 dilution of plasma.

[b] Coefficient of variation: $CV(\%) = \frac{s}{\bar{x}} \times 100.$